

Water Quality Standards

<http://dec.alaska.gov/water/wqsar/trireview/index.htm>

2011-2013 Triennial Review

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Water Quality Standards Current Issues November 2011

I. Purpose

This document summarizes pending and potential future Water Quality Standard (WQS) issues that may result in regulation revisions, guidance, or technical assistance projects.

II. Background Information

Every three years, the Alaska Department of Environmental Conservation (DEC) reviews Alaska's water quality standards. This comprehensive evaluation, called the *Triennial Review*, is required by the federal Clean Water Act and is an essential process that keeps Alaska's waters swimmable, fishable, and drinkable. This review helps to keep the pollution limits for Alaska's waters up-to-date by integrating new science, policy, and technology and federal requirements into how the State regulates water quality.

The *Triennial Review* process is carried out in three phases. Phase I is a widespread call for information on potential issues for the *Triennial Review*. In Phase II, DEC prioritizes the issues, researches and otherwise works on the highest priority issues, and drafts proposed water quality standard revisions if appropriate. Phase III comprises the formal rulemaking process for effecting the proposed change as amendments to the State's water quality standard regulations (18 AAC 70).

III. Pending Actions for Alaska

State Water Quality Standards (WQS) must be approved by the Environmental Protection Agency (EPA) before they can be used in Federal Clean Water Act (CWA) actions such as APDES or NPDES wastewater discharge permits, Total Maximum Daily Load allocations, CWA Section 303(d) impaired waterbody listings, and CWA Section 305(b) water quality assessment and monitoring reports.

There are several water quality standards for which the state approved regulations that have not yet been approved by EPA or have been disapproved

by EPA. A comparison of state and federally approved water quality standards can be found at

http://www.dec.state.ak.us/water/wqsar/wqs/pdfs/Comparison_of_State_and_Federally_Approved_WQS_2-2-10.pdf. These regulations include the following:

Mixing zone regulation:

In 2006 DEC revised the regulations to 1) reorganize the mixing zone regulations to improve clarity and reduce redundancy; 2) create exemptions to the prohibition on mixing zones in fish spawning habitat; 3) expand the spawning area prohibition on mixing zones to include lakes; 4) simplify some technical provisions including ones dealing with risk assessment, flow calculations, and mixing zone models; and 5) update a reference to federal technology-based effluent limitations. EPA continues to review the regulations for Clean Water Act approval and to consult with National Oceanic and Atmospheric Administration (NOAA) and U.S. Fish and Wildlife Service (FWS) for the Endangered Species Act and Essential Fish Habitat. They have not yet been approved.

Residues criteria (all uses):

DEC has adopted a change to the current criteria that prohibit all residues except for discharges authorized in a wastewater discharge permit and replace them with criteria based on whether the residues are considered objectionable or create a nuisance. DEC submitted final revisions to EPA on May 3, 2011. They have not yet been approved.

Natural condition-based standards (all uses):

In 2006, DEC added a narrative water quality standard for waters where the natural condition is of lower quality than the statewide water quality criteria, and to remove the site specific criteria provision for natural conditions in 18 AAC 70.235(b). The proposed narrative standard adopted by reference the *Guidance for the Implementation of Natural Conditions-Based Water Quality Standards*. On October 22, 2009, EPA disapproved DEC's implementation guidance and regulation.

IV. Potential Triennial Review Issues

A. High Priority Issues for Rulemaking: The following potential *Triennial Review* issues are projects that reflect prior commitments or current DEC high priorities already under review.

- Antidegradation
 - policy implementation guidance
 - nominations for Outstanding National Resources Waters (ONRW)

- Copper - Aquatic Life Criteria

B. Issues for Information Gathering and Analysis: The following issues are suggested for information gathering and analysis for potential future updates to high priority water quality standards. These issues may or may not be ready for rule making during this 2011-2013 *Triennial Review*.

- Standard Analytical Methods (routine and technical update)
- Toxics - Human Health Criteria for Consumption of Fish and Water
- Benthic Sediment Criteria

C. Issues for Monitoring: The following issues are suggested for tracking and monitoring for changes in scientific research and emerging issues. These issues are not anticipated to involve significant analysis or rule making during this *Triennial Review* unless circumstances change.

- Bacteria Criteria
- Biocriteria
- Dissolved Inorganic Substances for Total Dissolved Solids (TDS)
- Groundwater standards
- Iron - Aquatic Life Criteria (freshwater)
- Other Human Health Criteria Related Issues
 - carcinogens
 - methylmercury
 - manganese
- Nutrient Criteria –Cook Inlet Ecoregion
- Temperature Criteria

V. Issues Descriptions

A. High Priority Issues:

Antidegradation Policy Implementation Guidance:

While the State has an established antidegradation policy set out in 18 AAC 70.015, EPA also requires states to have a prescribed process for implementing the policy. In December 2009, DEC hosted a conference to share information about antidegradation policy implementation programs in other states and discuss approaches that might work best in Alaska. In July 2010, DEC established interim implementation methods, which were reviewed by EPA and found to be consistent with the EPA federal policy. DEC plans additional work during the 2011-2013 Triennial Review period including final implementing procedures.

DEC will establish a work group of representatives of key interests. The work group will be advisory in nature, providing DEC with various perspectives and informing the department's development of draft implementation methods regulations for public notice and comment. The objective is to seek overall efficiency and a better final product through early involvement of stakeholders.

Outstanding National Resources Waters (ONRW)

The interim antidegradation policy implementation guidance includes mechanisms to nominate Outstanding National Resource Waters (ONRWs) and designation of these waters under 18 AAC 70.015(a)(3). DEC will invite ONRW nominations as part of the Triennial Review public solicitation process. Any ONRW nominations received will be handled in accordance with the process prescribed by the final implementing procedures.

Copper - Aquatic Life Criteria

Recent studies (2003 – Present) on stormwater runoff and dissolved copper were conducted in the Pacific Northwest by researchers from the National Oceanic and Atmospheric Administration (NOAA) and Oregon State University. These studies indicate adverse effects on Pacific Salmon at very low concentrations ($< 10 \mu\text{g/L}$). There have been no peer reviewed studies of the effects of dissolved copper on fish in Alaska and very little is known about natural background levels of copper in Alaska's waters.

In general, scientific studies indicate that copper is not lethal and growth is not reduced for salmonids at concentrations at or below the current acute or chronic criteria. However, copper affects the salmonid olfactory system at lower concentrations, which may affect their survival or reproduction. The NOAA studies did not investigate whether dissolved organic carbon or other naturally occurring substances interact with copper to reduce the olfactory effects on salmonids.

During this Triennial Review DEC will do an updated review of the scientific literature and collaborate with other agencies to track research on factors affecting copper toxicity in aquatic life and the response to naturally elevated levels of copper in some waters.

B. Issues for Information Gathering and Analysis:

Standard Analytical Methods

Standard methods required to measure compliance with Alaska Water Quality Standards were last adopted in 2006. This Triennial Review issue will review and adopt the most current EPA-approved Clean Water Act analytical methods.

Toxics - Human Health Criteria for Consumption of Fish and Water

Human health criteria are water quality criteria that control contaminants that can reach humans through consumption of water and aquatic organisms (e.g. fish, shellfish). Key factors in the calculations used to derive human health criteria are the amount and type of fish a human in a typical population eats. Department of Health and Social Services has estimated that fish consumption rates for some Alaskan villages may be up to 10 times above the 6.5 g/day that the EPA originally used in 1980, which is the default value used in current Water Quality Standards. Fish intake varies widely from village to village.

In 2000, EPA developed a new method for calculating human health criteria using a fish consumption rate of 17.5 grams/day in place of the 6.5 grams/day value used previously. In December 2002, EPA published updated human health criteria based on the new methodology.

This Triennial Review issue consists of examining data and assumptions for fish consumption rates in Alaska along with the latest federal guidance for protecting human health, and updating the water quality criteria for human health based on this information. One option is to adopt the EPA value that would apply throughout the state, but then include a regulation that requires significant dischargers to document actual consumption of resident fish down gradient of the discharge for purposes of considering site-specific criteria.

Benthic Sediment Criteria

The State does have general narrative criteria that apply to toxic substances and petroleum contamination in sediments. Maintaining the quality of sediments can be important for maintaining water quality and protecting water uses. Many other states have adopted more specific guidance and/or numeric sediment quality criteria in addition to, or in conjunction with quality criteria for ambient water. This potential Triennial Review issue consists of examining the need and value of the State developing and adopting numeric sediment quality criteria and/or guidance on the development of site specific sediment quality criteria.

C. Issues for Monitoring

Bacteria Criteria

In 1986, EPA published its *Ambient Water Quality Criteria for Bacteria* document, in which it recommended the use of *E. coli* and enterococci rather than fecal coliform as indicators for human pathogens to protect recreational uses. In March 1999, EPA released its Beach Action Plan. In this plan, EPA committed to developing a policy to facilitate state adoption of the recommended water quality criteria. In May 2002, the EPA released a final draft of the Bacteria Criteria Implementation Guidance. EPA promulgated

bacteria criteria for marine recreational uses in Alaska on November 16, 2004. This potential Triennial Review issue consists of considering changes to reconcile the State water quality criteria for bacteria with the updates in federal guidance. EPA is under court order to release draft analytical methods for qPCR (quantitative polymerase chain reaction) for the fecal indicator organism enterococci.

Biocriteria

The Clean Water Act allows water quality standards to be based on chemical, physical and biological criteria. Currently, Alaska's water quality standards are predominantly derived from physical and chemical water quality criteria. This potential Triennial Review issue consists of looking at the potential development and use of biological criteria, or "biocriteria," as the basis for establishing water quality standards. Because the necessary knowledge base to establish numeric biocriteria will not be available for at least ten years, this effort will not yield amendments to add numeric biocriteria to the water quality standards during this triennial review cycle. The effort could lead, however, to adopting general narrative biocriteria into the water quality standard regulations.

Dissolved Inorganic Substances, Total Dissolved Solids (TDS):

The current criteria were adopted in 1999. TDS is a measure of inorganic salts, organic matter, and other dissolved materials in water (US EPA 1986). The current TDS criteria for drinking water supply and aquatic life is 500 mg/l. A demonstration of "no adverse affect" is allowed for the 500-1000 mg/l TDS range for aquatic life criteria under Note 12 of the criteria table in 18 AAC 70.020(b). In some studies, adverse effects as low as 250 mg/l calcium-based TDS were found for exposure during fertilization of Chinook salmon and some other salmonids. In April 2002, EPA approved Alaska's current TDS criteria. However, the approval letter indicated the specific outcomes of applying the narrative standard in Note 12 would require a case-by-case EPA review until sufficiently detailed implementation procedures were developed by DEC and approved by EPA. In 2006 the Department reviewed research literature on TDS and its effect on fish and other aquatic life and found toxicity values (LC 50) less than the current standard of 500 mg/l. Given the literature review findings, DEC is considering revising the current standards.

Groundwater Standards

Under current regulations, groundwater is protected for aquaculture use, using the same aquatic life criteria that apply to surface waters. While there is no aquatic life in the groundwater, aquaculture facilities (e.g. hatcheries) may use treated groundwater to raise aquatic organisms. The more common use of groundwater is for drinking water. Water quality criteria to protect humans for drinking water are less stringent for many substances than the criteria to

protect aquatic life, which are more sensitive. Therefore, protecting all groundwater for an aquatic life use, when that use is rare or non-existent, may not be necessary. The Department may consider alternatives that ensure protection of aquatic life, where groundwater discharges to surface waters.

Iron - Aquatic Life Criteria (freshwater)

The current water quality standard for iron was published by EPA in 1976. More recent studies suggest different forms of Iron may have different toxicity once in the water. The department is currently conducting a technical review under a private contract for studies regarding a site specific criterion for iron. The purpose of the contract is to review data and applicable literature regarding total and dissolved Iron in surface waters and potential interactive effects with other pollutants of concern.

Carcinogens - Human Health Criteria

In 1992, EPA promulgated human health criteria for carcinogens for the State of Alaska under the National Toxics Rule (NTR). This potential Triennial Review issue consists of reviewing the latest information, guidelines and rules for establishing water quality criteria for carcinogens and proposing amendments to the water quality standard regulations. A potential positive outcome of this update would be withdrawal Alaska from the 1992 NTR federal criteria, which would reduce confusion regarding which standards (State or federal) apply in Alaska.

Methylmercury - Human Health criteria

In January 2001, EPA published water quality criteria for methylmercury and for the first time based the human health criteria on fish and shellfish tissue concentration rather than on a water column value. At that time 0.3 mg methylmercury/kg fish tissue wet weight, was established as EPA's criteria. This criteria describes the concentration of methylmercury in freshwater and estuarine fish and shellfish tissue that should not be exceeded to protect consumers of fish and shellfish among the general population. Methylmercury is the toxic form of mercury in water that can enter into fish and humans. This potential Triennial Review issue would consist of examining the new fish tissue-based methylmercury criteria for application in Alaska along with available methods to translate the criteria from a fish tissue concentration to a concentration in water. The effort could result in proposed regulations.

Manganese - Human Health Criteria

The current human health criteria for manganese is based on EPA recommendations originally published in 1976. The criteria document indicates that manganese at levels over 0.05 mg/l may cause taste, staining and other primarily aesthetic problems. Manganese is considered a secondary (aesthetic) drinking water contaminant by EPA and has no direct health effects at the level

of the currently adopted human health criteria for consumption of water and aquatic organisms. This potential Triennial Review issue would consider updating the human health criteria for manganese based on more recent information and EPA's guidance published in 2000 that established a lifetime health advisory for manganese at 0.3 mg/l.

Nutrient Criteria - Cook Inlet Ecoregion:

Preliminary nutrient studies have been undertaken on several lakes in the Cook Inlet ecoregion, including the Anchorage area, the Matanuska-Susitna valley, and the western half of the Kenai Peninsula. This ecoregion is the most likely area for impact by nutrients from urban and agricultural runoff. More study will be necessary before there is sufficient data to characterize lakes in the area and adopt numeric nutrient criteria. Narrative criteria to address nutrient problems were adopted as part of the 2003 amendments to the water quality standard regulations. This potential triennial review issue consists of inventorying and assessing data on nutrient levels in the region, determining whether there is sufficient information and need to amend the 2003 criteria, and proposing amendments to the water quality standard regulations, if indicated.

Temperature Criteria:

EPA Region 10 has published guidance on implementation of temperature criteria. Water temperature criteria have recently been reviewed in Idaho and Oregon because of the potential impact on native fish and aquatic life. Studies have indicated that increases in stream temperatures, shifts in annual temperatures, and loss of cold water refuges can have a negative impact on salmon. There may be effects on embryonic development, juvenile growth, adult migration, competition with non-native species, and risk and severity of disease. This potential triennial review issue consists of examining the growing body of knowledge on the effects of increasing temperatures on aquatic life, particularly salmonids, and proposing amendments to the water quality standard regulations if indicated.